Office Action Summary	Application No. 09/889,372	Applicant(s) NAKAGAWA, JUN	
	Examiner PETER-ANTHONY PAPPAS	Art Unit 2628	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _14 August 2009_.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1,2,10-12,20-22 and 27_ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1,2,10-12,20-22 and 27_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _16 July 2001_ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☒ Interview Summary (PTO-413) Paper No(s)/Mail Date. _12/7/09_ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Allowable Subject Matter

1. Claims 1, 2, 11, 12, 21 and 22 would be allowable if claims 1, 11 and 21 were rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action. In regard to said claims the cited prior art of record fails to teach or suggest the respective claim limitations when considered as whole. It is noted that "alpha (α) value," as disclosed in said claims, is considered to read on transparency, translucency or opacity (specification, p. 3, ll. 23-24) and not a red, green or blue color value or a combination thereof.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1, 2, 10, 11, 12, 20-22 and 27 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Said claims recites the limitation "the depth cueing effect" (claim 1 – line 25; claim 10, line 18; claim 11, line 23; claim 21, line 21; claim 27, line 13). There is insufficient antecedent basis for this limitation in the claim. For the purposes of applying prior art it is noted that "the depth cueing effect" is considered to read "a depth cueing effect."

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 10, 20 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Foley et al. (Computer Graphics: Principles and Practice) in view of Deering (U.S. Patent No. 6, 734, 850 B2) and further in view of Griffin (U.S. Patent No. 5, 990, 904).

6. In regard to claim 10 it is noted that the respective claim language discloses open-ended language (e.g., “comprising”) and as such said claim is not considered to be limited to only the respective disclosed limitations. Foley et al. teach an image generation system comprising: a memory which stores a program and data for image generating; at least one processor which is connected to the memory and performs processing for image generating (p. 17, §1.6.1; p. 17, Fig. 1.5; p. 170, § 4.3.2, ¶ 1; p. 171, Fig. 4.22).

Foley et al. teach depth cueing (“The depth (distance) of an object can be represented by the intensity of the images: Parts of the objects that are intended to appear farther from the view are displayed at lower intensity ... This affect is known as depth cueing. Depth cueing exploits the fact that distance objects appear dimmer than closer objects, especially if seen through haze. Such effects can be sufficiently convincing that artists refer to the use of changes in intensity (as well as in texture, sharpness, and color) to depict distance as aerial perspective. Thus, depth cueing may be seen as a simplified version of the effects of atmospheric attenuation.” – p. 610, § 14.3.4; pp. 727, 728, §16.1.3; pp. 1044-1046, §20.8.2) such that the color of the object being more distance from a viewpoint is made closer to a target color (“…depth cueing

is implemented by interpolating ... Color graphics systems usually generalize the technique to support interpolating between the color of a primitive and a user-specified depth-cue color, which is typically the color of a background." – p. 611, § 14.3.4).

Foley et al. teach depth cueing only for an object positioned within a depth cueing volume (e.g., finite view volume; Fig. 6. 19) the depth cueing volume being defined as a partial subset of a viewing volume (e.g., infinite view volume which includes said finite view volume; Fig. 6.17) based on a position of the viewpoint (e.g., VRP – view reference point) and includes a backward clipping plane of the viewing volume ("For a perspective projection, the view volume is the semi-infinite pyramid … For parallel projections, the view volume is an infinite parallelepiped … At times one might want the view volume to be finite, in order to limit the number of output primitives projected on the view plane … view volume is made finite with a front clipping plane and back clipping plane ... These planes are specified ... relative to the view reference point..." – p. 239, 240, § 6.2; "...The back clipping plane is placed so as to cut through the objects being displayed ... A front clipping plane may also be used … Back-plane depth clipping can be thought of as a special case of depth cueing... " – p. 611, § 14.3.5). It is noted that said view reference point is considered to read on a viewpoint and that generating a finite view volume from an infinite view volume is considered to read on creating a sub-volume (e.g., view volume) from said infinite view volume for graphic processing.

As disclosed above Foley et al. teach that the parts of objects that are intended to appear farther from the viewer are displayed at lower intensity (p. 610, § 14.3.4).

However, Foley et al. fail to explicitly teach varying an alpha value of the object so that the object being more distant from the viewpoint becomes more transparent. Deering teaches varying an alpha value of the object so that the object being more distant from the viewpoint becomes more transparent ("Another visual effect used to increase the realism of computer images is alpha blending. Alpha blending is a technique that controls the transparency of an object … Another effect used to improve realism is fogging. Fogging obscures an object as it moves away from the viewer. Simple fogging is a special case of alpha blending in which the degree of alpha changes with distance so that the object appears to vanish into a haze as the object moves away from the viewer. This simple fogging may also be referred to as 'depth cueing' or atmospheric attenuation, i.e., lowering the contrast of an object so that it appears less prominent as it recedes." – col. 2, ll. 34-51; Figs. 6, 7). Deering further teaches storing color, alpha and depth (e.g., Z) values for each vertex (col. 14, ll. 39-43; Figs. 6, 7). Deering implicitly teaches varying the alpha value based, at least in part, on a Z-value because Deering teaches varying the alpha value for the object in response to said object moving away from a viewer and depth (e.g., Z) is one of the three coordinates (e.g., X, Y, Z) utilized by Deering for ascertaining the location of information in space (col. 2, ll. 39-40; col. 14, ll. 39-43; Figs. 6, 7).

It is noted that the respective claim language fails to disclose what exactly constitutes a "depth cueing value" or to what, if anything, a "depth curing value" is assigned. Thus, the combination of alpha and color information, which represents the visual appearance of an given object at any given point in time, is considered to read on

a "depth cueing value" for an object. Deering implicitly teaches increasing a depth cueing value for an object based, at least in part, on a Z-value as said depth value is a factor in the calculation of a respective alpha value which in turn is a factor, along with color information, in the calculation of an overall depth cueing effect for said object. In other words as depth increases for an object which is moving away from a viewer alpha is changed in kind and the combination of said alpha along with respective color information renders the object increasingly more transparent as said object moves further and further away (e.g., color of the object is brought closer to the target color as the Z-value increases).

It would have been obvious to one skilled in the art, at the time of the Applicant's invention, to combine the teachings of Foley et al. and Deering, both of which are directed toward depth cueing and atmospheric attenuation, because through such incorporation it would increase the realism of the computer graphics generated by said system ("Another visual effect used to increase the realism of computer images is alpha blending…" – col. 2, ll. 34-51) and thus provide a more pleasing visual experience.

Foley et al. teach a viewing means by which rendered objects are viewed dependent on a given perspective projection, wherein the presented view of said objects change in accordance with the change of said perspective projection. The visual effect of said perspective projection is similar to that of photographic (camera) systems (p. 230-236, § 6.1). Foley et al. teach the use of a synthetic camera (p. 299-302, § 7.3.4).

Foley et al. and Deering fail to explicitly teach sorting objects so that the objects are drawn in succession starting from an object nearest to the viewpoint and drawing an image in an object space in drawing order determined by the sorting process (e.g., front to back). Griffin teaches sorting objects so that the objects are drawn in succession starting from an object nearest to the viewpoint ("…accumulation can be performed in front-to-back ... In a front-to-back approach…" – col. 42, ll. 10-67; col. 43, ll. 1-46), and performing hidden-surface erasing based on a Z-buffer process for the objects (col. 9, ll. 55-57; col. 3, ll. 48-49). Griffin implicitly teaches drawing an image in an object space in drawing order determined by said sorting process because Griffin teaches displaying accumulated graphic information (e.g., via display 142 – col. 12, ll. 46-49) wherein said accumulated graphic information is accumulated in a front-to-back manner.

It would have been obvious to one skilled in the art, at the time of the Applicant's invention, to incorporate the teachings of Griffin into the system taught by Foley et al. and Deering, because such incorporation would reduce the amount of memory required for the storage of the image data within the graphics system, via the use of accumulation, thus requiring less physical memory to be implemented or allocated within said graphics system for the storage of said image data. Furthermore, Griffin teaches that the system's ability to support advanced real time animation makes it well-suited for games, educational applications, and a host of interactive applications (col. 7, ll. 1-5) and thus such incorporation would improve the flexibility in how said system is implemented.

Foley et al. teach performing hidden-surface erasing based on a Z-buffer process for the objects while drawing (e.g., scan-converting) graphic information (p. 668-672, § 15.4).

7. In regard to claim 20 Foley et al. teach a computer readable information storage medium encoded with a computer program (pp. 17, § 1.6.1; p. 18, § 1.6.2; pp. 165, 166, § 4.3; pp. 166, 167, § 4.3.1). The rationale disclosed in the rejection of claim 10 is incorporated herein.

8. In regard to claim 27 the rationale disclosed in the rejection of claim 10 is incorporated herein. It is noted said system is considered to perform a respective method.

Response to Amendment

9. The prior 35 U.S.C. 101 rejections have been withdrawn in light of the respective instant claim amendments.

10. In response to applicant's remarks that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., limiting the processing of depth cueing to a depth cueing volume subset) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See In re Van Geuns, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). It is noted that claims 10, 20 and 27 disclose limiting the variance of an alpha value to a depth cueing volume subset. Said claims fail to disclose performing depth cueing only within a depth cueing

volume subset. Applicant is directed to the respective above rejections which have been clarified to address applicant's remarks.

11. In response to applicant's remarks that Foley et al. merely teach defining a finite view volume to limit the number of output primitives through the use of front and back clipping planes and that this limits the field of view (view volume) and does not limit the processing of depth cueing to a depth cueing volume subset that is less than the whole view volume as claimed the examiner does not entirely agree. Foley et al. do teach defining a finite view volume, from an infinite view volume, to limit the number of output primitives through the use of front and back clipping planes and it is noted that said finite view volume does limit the field of view to the finite view volume. However, said finite view volume still remains a subset of said the infinite view volume from which it originates. Furthermore, it is noted that processing is limited to said finite view volume, once said finite view volume is created, as said finite view volume is the only portion in which primitives exist for processing. It is unclear to the examiner what would be processed outside of an established finite view volume. Clarification is requested.

12. Applicant's remarks have been fully considered but they are not persuasive.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PETER-ANTHONY PAPPAS whose telephone number is (571) 272-7646. The examiner can normally be reached on M-F 9:00AM-5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ulka Chauhan can be reached on 571-272-7782. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Peter-Anthony Pappas/
Primary Examiner, Art Unit 2628